G-102

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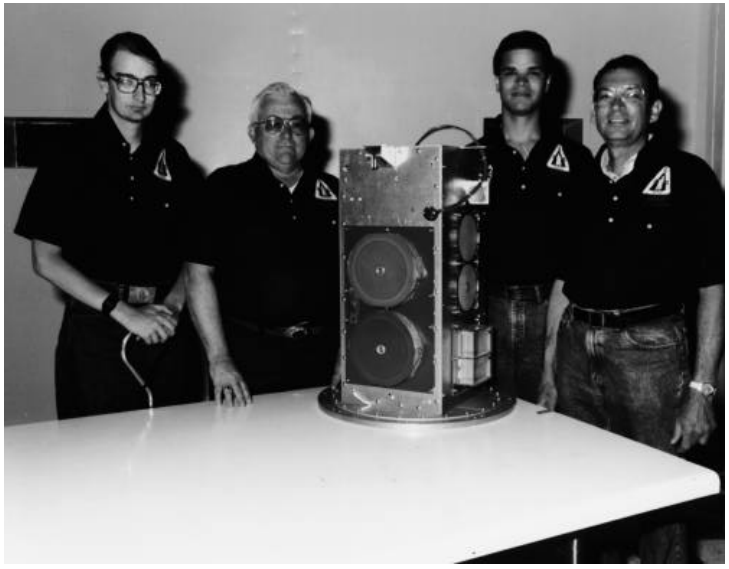
Customer: Boy Scouts of America's Exploring Division; Andy Shaw
Payload Mgr: John Wolfgang
NASA Tech Mgr: Tom Dixon
Mission: STS-47, September 12, 1992

In 1978, Explorer posts were invited to submit ideas for experiments. The final flight complement of seven experiments was selected through a three-stage elimination process from 38 proposals originally submitted. The seven experiments and their sponsors were: Capillary Pumping, Explorer Post 9005, sponsored by the McDonnell Douglas Corporation, St. Louis, MO; Cosmic Ray, Explorer Ship 101, sponsored by the American Legion of Bridgeport, CT; Crystal Growth, Explorer Post 310, and Emulsions, Explorer Post 475, both sponsored by Chesebrough Pond's Research Laboratory, Trumbull, CT; Fiber Optics, Explorer Post 475, sponsored by the Naval Avionics Center, Indianapolis, IN; Floppy Disk, Explorer Post 1022, sponsored by the Church of Jesus Christ of Latter Day Saints, Columbia, MD; Fluid Droplets, Explorer Post 822, sponsored by Martin Marietta, Littleton, CO; Command, Power and Mechanical Systems, Explorer Post 1275, sponsored by the Goddard Explorer Club of NASA Goddard Space Flight Center, Greenbelt, MD.



(L to R) Thomas Welsh, Joseph Lanning, Georg Thomas, and Fred Wulff. G-102 was a unique opportunity through a competition that allowed seven Explorer posts to test their ideas in space. Sponsorship was provided by TRW Systems Integration Group of Fairfax, Va.

G-330

80

Customer: Swedish Space Corporation, Solna, Sweden; Kjell Anflo
Payload Mgr: Kennith Loth
NASA Tech Mgr: Barbara Milner
Mission: STS-47, September 12, 1992

The scientific aim of this experiment was to study the breakdown of a planar solid/liquid interface when the growth rate increased from stable to unstable conditions. To do this, a sample of Germanium doped with Gallium would be processed during the flight. To perform the experiment, a gradient furnace was developed in which the growth rate could be controlled along the crystal. The gradient furnace consisted of a ceramic crucible with five heating elements and a cooler.

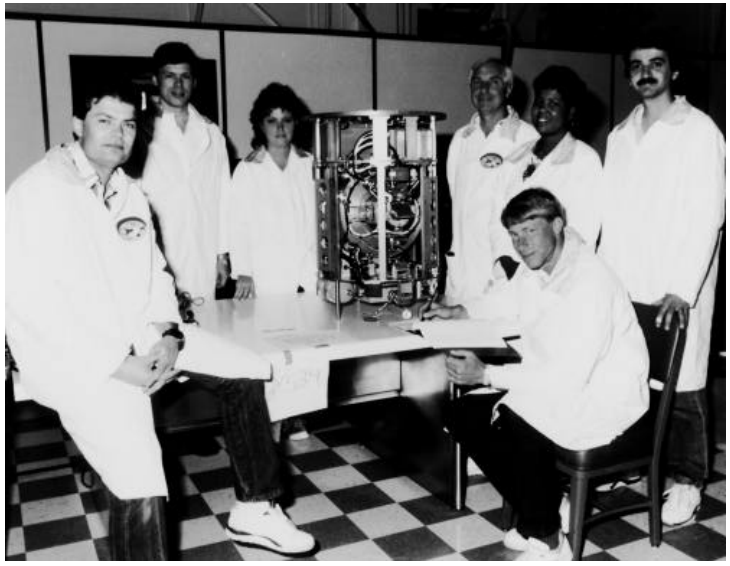
(L to R) Barbara Milner, Henrik Malmström and Kennith Loth prepared the G-330 payload for flight. This Swedish payload utilized a sophisticated thermal design to control the growth rate of a crystal.

G-534

81

Customer: NASA Headquarters;
Warren G. Hodges
Payload Mgr: Angel Otero
NASA Tech Mgr: Tom Dixon
Mission: STS-47, September 12, 1992

The objective of this experiment was to improve the understanding of the fundamental mechanisms that constitute nucleate pool boiling. The experiment investigated the heat transfer and vapor bubble dynamics associated with nucleation, bubble growth/collapse and subsequent motion.



(L to R) Angel Otero, Andrew Sexton, Lily Facca, James Laubenthal, Carmela Bynum, David Francisco, and (foreground) Dan Williston integrated G-534 at Kennedy Space Center.

G-521

82

Customer: Canadian Space Agency, Ottawa, Canada; Glen Campbell
Payload Mgr: Darren Gates
NASA Tech Mgr: Russ Griffin
Mission: STS-47, September 12, 1992

This payload was called QUESTS (Queen's University Experiment on the Shuttle Transportation System) and included 15 furnaces. Twelve of the furnaces were constant-temperature furnaces. These furnaces would be used for studies of diffusion in metals when in the liquid state. The other three furnaces were temperature-gradient, in which a uniform temperature gradient was applied along the sample, and the temperatures were slowly decreased to allow crystal growth to occur from one end of the sample.

(L to R foreground) Stephen Goodman and Roy Millard worked on G-521 prior to launch while (L to R rear) Russ Griffin and Darren Gates checked through documentation.

G-255

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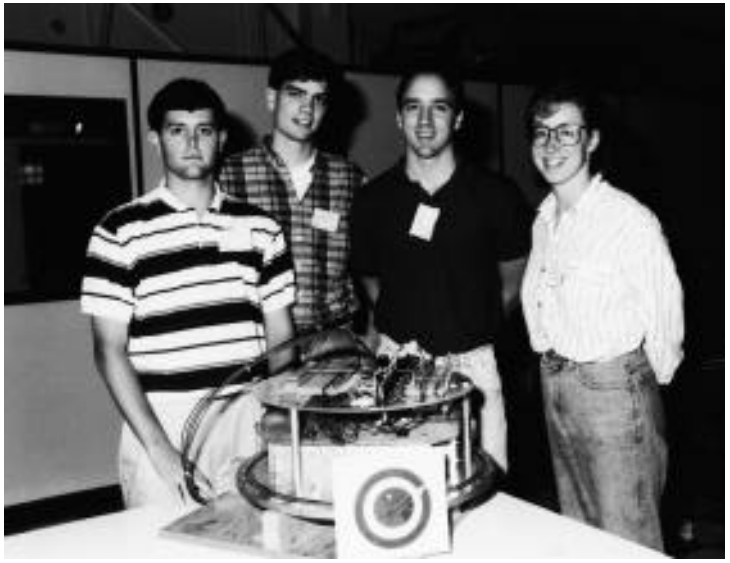
Customer: University of Kansas, Lawrence, Kansas; Dr. Saeed Farokhi
Payload Mgr: Michael D. Peck
NASA Tech Mgr: Russ Griffin
Mission: STS-47, September 12, 1992

This payload contained three experiments based on the analysis of biochemistry structures in microgravity. The payload used a computer controller and an active thermal control system. The first experiment was to crystallize enzymes. The second intended to conduct research in cell formations. In the third experiment, seeds were used to test any effects that the space environment may have on seed germination rates.

The University of Kansas Space Program at the time of flight was comprised of volunteer undergraduate engineering and science majors.



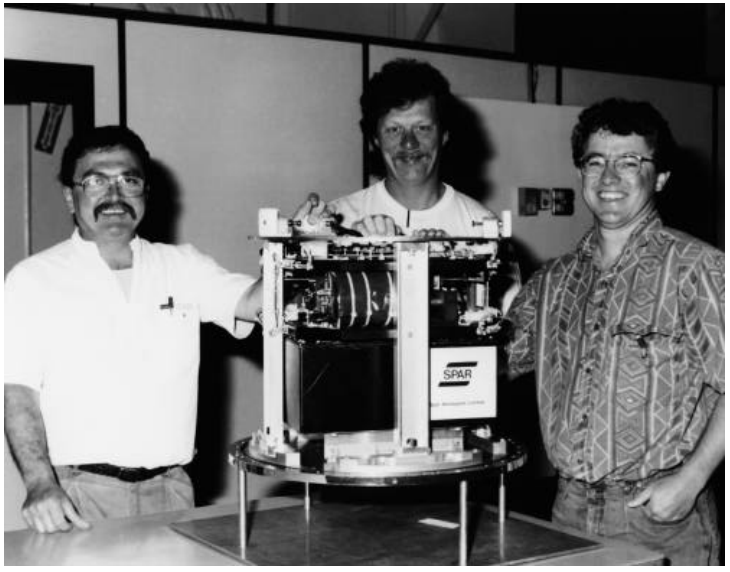
(L to R) Michael Peck, Michael Whittenburg, Tom Miller, and Kimberly Lowe worked together to prepare G-255 for flight. Many colleges and universities have utilized the GAS program to add an interesting variation to their engineering programs.

G-482

84

Customer: Spar Aerospace Ltd., Quebec, Canada; Ray Windsor
Payload Mgr: Gerard Senechal
NASA Tech Mgr: Tom Dixon
Mission: STS-47, September 12, 1992

The purpose of this experiment was to compare the behavior of bread yeast in the absence of gravity to the behavior of bread yeast in normal atmospheric conditions. The experiment mixed flour, water and the designated yeast on-orbit, allowed the mixture to rise, and then "baked" it.



(L to R) Michel Larouche, Serge Rozon and Gerard Senechal stood by G-482 just prior to installing it into a GAS canister.

G-520

85

Customer: Frank Miles
Payload Mgr: Brian Stockwell
NASA Tech Mgr: Gerard Durback
Mission: STS-47, September 12, 1992

The Ashford School of Kent, England was the first British school experiment to fly in space. The project won first prize in a nationwide school competition run by Independent Television News (ITN). Two experiments were part of this payload. In the first, the students designed a small, leak-proof, transparent container filled with sodium silicate solution. A few grams of cobalt nitrate crystals would be released into the center of the solution. As soon as the crystals were dropped into the solution, a camera would record about 100 pictures for study on return to Earth.

In the second experiment, a chemical solution was placed on a gel containing another compound, resulting in a series of rings appearing in the gel. The resulting rings would be photographed by a second camera, taking 100 pictures of crystal growth at varying intervals over 4 days.

(L to R) Gerard Durback, Larry Thomas, and Brian Stockwell did the final preparations on G-520. This was the first British educational payload to fly in the GAS program.

G-300

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Customer: Matra Marconi Space; Daniel Kaplan
Payload Mgr: Laboratorie De Genie Electrique De Paris; Jean-Claude Perron
NASA Tech Mgr: Rick Scott
Mission: STS-47, September 12, 1992

This was the first GAS payload to fly from France. The objective of this experiment was to explore thermal conductivity of liquids in microgravity. Measurements were to be performed on three liquids: distilled water (as a standard) and two silicone oils. Using a modified "hot plate" method, a simplified guard ring would reduce the heat losses.

(L to R) Nicole Lecaude, Pascal Chretien, Claude Garnier, and Jean-Claude Perron worked with Rick Scott (far right) on G-300 which was the first GAS payload from France. It contained three liquids which were being tested for thermal conductivity.

G-613

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Customer: University of Washington, Seattle; Dr. Adam Bruckner
Payload Mgr: Jeff Slostad
NASA Tech Mgr: Ben Lui
Mission: STS-47, September 12, 1992

This experiment—an experimental cooling system, was designed by University of Washington engineering students. Liquid droplets would be pumped from a shower head-like device to a spinning collection bowl that substituted for gravity by acting as a centrifuge. The rotating bowl threw the weightless liquid to the edge and directed it into a collection pipe for reuse. A smaller experiment, a micro heat pipe, was also flown in this canister.

The students from the University of Washington (back row) designed two experiments to fly in G-613. (Front L to R) Ben Lui, Larry Thomas and Jeff Slostad helped the students during integration.